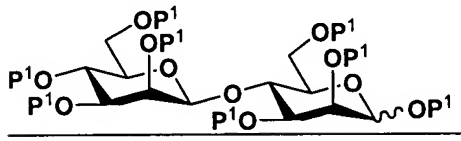
AMENDMENTS TO THE CLAIMS

1. (Cancelled)

2. (Currently amended) ~~The~~ A method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of ~~the~~ a reducing terminal in ~~the~~ a core sugar chain structure of an asparagine-linked glycoprotein, ~~of claim 1, further~~ comprising each of

(1) a process of preparing a mannose disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) of the formula (I)



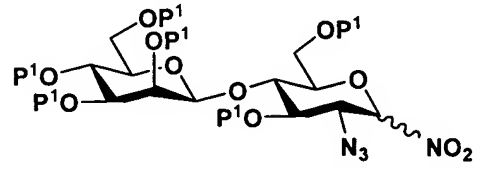
(I)

wherein P^1 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and the wavy line means that $-OP^1$ is linked at an axial or equatorial position, or mixture of both,

by hydrolyzing a polysaccharide having mannose β-1,4-bonds and protecting OH groups of the resulting hydrolysate,

(2) a process of preparing a glycal compound, in which mannose of ~~the~~ a reducing terminal of the mannose disaccharide is converted to glycal, by halogenation and reduction of the mannose disaccharide (a type of $ManP^1\beta1\rightarrow4ManP^1$), and

(3) a process of preparing an azide disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) shown with formula (II) in which ~~the~~ a 2-azide group of mannose in ~~the~~ a reducing terminal is linked at ~~the~~ an equatorial position;



(II)

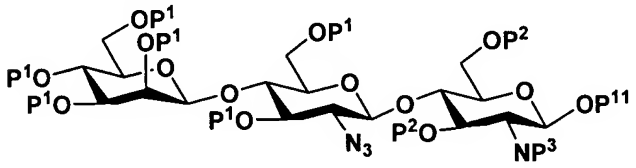
wherein P^1 is the same as described above, the wavy line means that $-NO_2$ is linked at an axial or equatorial position, or mixture of both,

by azidenitration reaction of the glycal compound above.

3. (Currently amended) The method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of ~~the~~ a reducing terminal in ~~the~~ a core sugar chain structure of an asparagine-linked glycoprotein of claim 2, further comprising

(4) a process of substituting the nitro group of the azide disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) with a leaving group selected from the group consisting of fluorine atom, chlorine atom, trihaloacetoimidate, pentenyl, alkylthio and arylthio, and

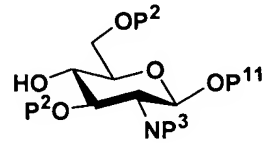
(5) a process of preparing a trisaccharide compound (a type of $Man\beta1\rightarrow4GlcNP^1\beta1\rightarrow4GlcNP^2$) shown with the formula (III);



(III)

wherein P^1, ~~P^2, P^3 and P^{11} are~~ is an OH- protecting group, as described above, P^2 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, P^3 is an amino-protecting group selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl, and P^{11} is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, ~~the same above,~~

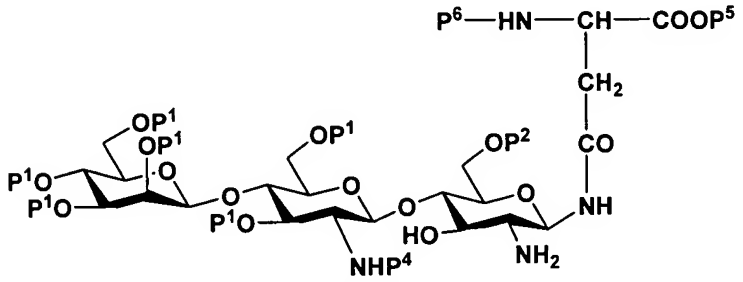
by a reaction of the product having the leaving group with amino-protected glucopyranoside shown with the formula;



wherein P^2, P^3 and P^{11} are the same as described above. ~~is an OH-protecting group, P^3 is an amino-protecting group and P^{11} is an OH-protecting group.~~

4. (Currently amended) The method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of ~~the~~ a reducing terminal in ~~the~~ a core sugar chain structure of an asparagine-linked glycoprotein of claim 3, further comprising

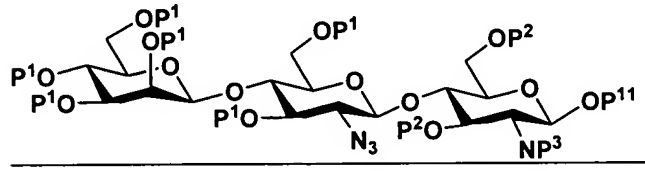
(6) a process of preparing an asparagine-linked trisaccharide (Manβ1→4GlcNP^{1}β1→4GlcNP^2) compound shown with the formula (IV);



(IV)

wherein P^1 and P^2 are independently OH-protecting groups, as described above~~the same above~~, P^4 and P^6 are independently amino-protecting groups selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl, and P^5 is a carboxyl-protecting group which is t-Bu,

by deprotecting the P^{11} group of the compound (III),



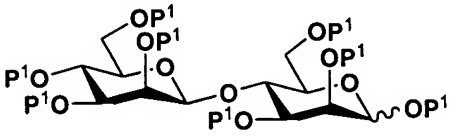
(III)

wherein P^1, P^2 and P^{11} are independently OH-protecting groups, as described above, and P^3 is an amino-protecting group, as described above,

reducing the azide group to an amino group, protecting the amino group with an acetyl group, forming an oxazoline ring simultaneously with deprotecting a hydroxy group of a reducing terminal, and coupling with a protected asparagines derivative after introducing a -N=C=S group at the reducing terminal.~~coupling of the reducing terminal of the trisaccharide compound above with the protected asparagine derivative.~~

5. (Currently amended) A method for preparing a mannose disaccharide compound

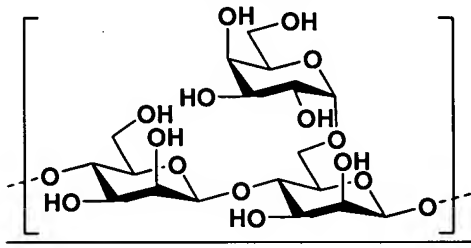
(a type of $ManP^1\beta1\rightarrow4ManP^1$) shown with the formula (I);



(I)

wherein P^1 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and the wavy line means that $-OP^1$ is linked at an axial or equatorial position, or mixture of both,

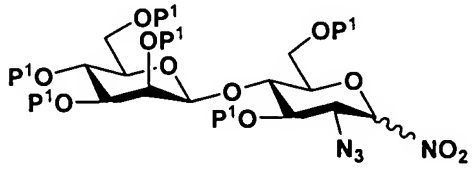
by hydrolyzing guar gum or galactomannan of the formula (V);



(V)

wherein n is an integer of 50 or more, ~~a polysaccharide having mannose β-1,4-bonds~~ and protecting OH groups of the resulting hydrolysate.

6. (Currently amended) A method for preparing ~~the~~ an azide disaccharide (a type of $ManP^1\beta1\rightarrow4ManP^1$) shown with the formula (II) in which ~~the~~ a 2-azide group of mannose in ~~the~~ a reducing terminal is linked at ~~the~~ an equatorial position;

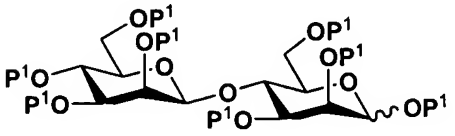


(II)

wherein P^1 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and the wavy line means that $-NO_2$ is linked at an axial or equatorial position, or mixture of both,

comprising a process of preparing a glycal compound, in which mannose of the reducing

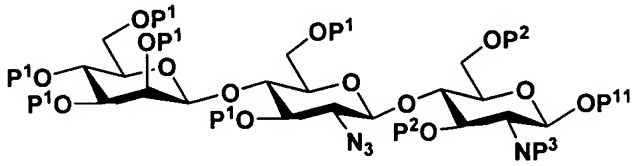
terminal of the mannose disaccharide is converted to glycal, by halogenation and reduction of the mannose disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) shown with the formula (I);



(I)

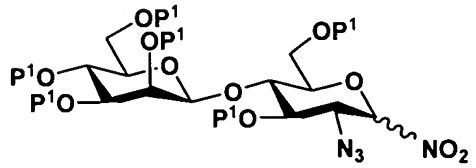
wherein P^1 is the same as described above and the wavy line means that $-OP^1$ is linked at an axial or equatorial position, or mixture of both,
and subsequent azidenitration reaction of the glycal compound.

7. (Currently amended) A method for preparing ~~the~~ a trisaccharide compound shown with the formula (III);



(III)

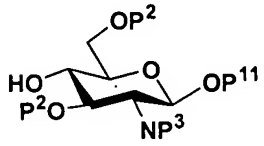
wherein P^1, P^2 and P^{11} are independently OH- protecting groups selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and P^3 is an amino-protecting group selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl,~~wherein P^1, P^2, P^3 and P^{11} are the same above,~~
comprising a process of substituting the nitro group of the azide disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) shown with the formula (II) with a leaving group selected from the group consisting of fluorine atom, chlorine atom, trihaloacetoimidate, pentenyl, alkylthio and arylthio;



(II)

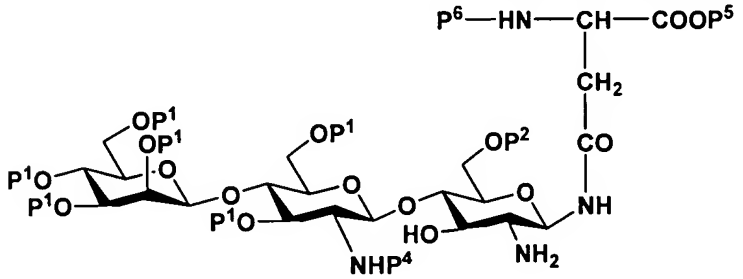
wherein P^1 is the same as described above, the wavy line means that $-NO_2$ is linked at an axial or equatorial position, or mixture of both, and ~~the~~ a 2-azide group of mannose in the reducing terminal is linked at the equatorial position,

and next, reacting the substituted compound having the leaving group with amino-protected glucopyranoside of the formula;



wherein P^2, P^3 and P^{11} are ~~is an OH-protecting group~~ the same as described above. ~~, P^3 is an amino-protecting group and P^{11} is an OH-protecting group.~~

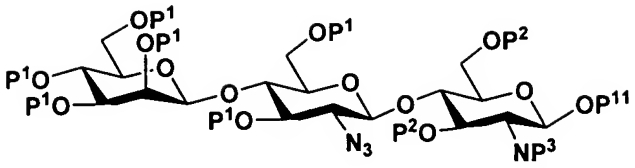
8. (Currently amended) A method for preparing an asparagine-linked trisaccharide compound (Manβ1→4GlcNP^{1}β1→4GlcNP^2) shown with the formula (IV)



(IV)

wherein P^1 and P^2 are independently OH- protecting groups selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, ~~the same above,~~ P^4 and P^6 are independently amino-protecting groups selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl, and P^5 is a carboxyl-protecting group which is t-Bu,

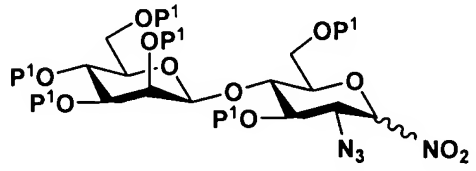
by ~~coupling of the reducing terminal of the trisaccharide~~ deprotecting the P^{11} group of the compound (III),



(III)

wherein P^1, and P^2 are the same as described above, P^3 is an amino-protecting group selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl, and P^{11} is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, reducing the azide group to an amino group, protecting the amino group with an acetyl group, forming an oxazoline ring simultaneously with deprotecting a hydroxy group of a reducing terminal, and coupling with a protected asparagines derivative after introducing a -N=C=S group at the reducing terminal. ~~and P^{11} are the same above, with a protected asparagine derivative.~~

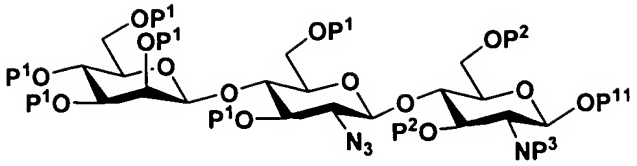
9. (Currently amended) ~~The~~ An azide disaccharide (a type of $ManP^1\beta1\rightarrow4ManP^1$) compound shown with the formula (II);



(II)

wherein P^1 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and the wavy line means that $-NO_2$ is linked at an axial or equatorial position, or mixture of both.

10. (Currently amended) ~~The~~ A trisaccharide compound (a type of $Man\beta1\rightarrow4GlcNP^1\beta1\rightarrow4GlcNP^2$) shown with the formula of (III);

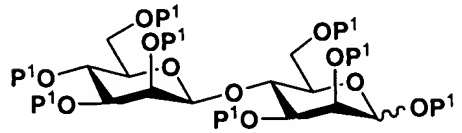


(III)

wherein P^1, P^2 and P^{11} are independently OH-protecting groups selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and P^3 is an amino-protecting group selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl.

11. (New) A method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of a reducing terminal in a core sugar chain structure of an asparagine-linked glycoprotein, comprising

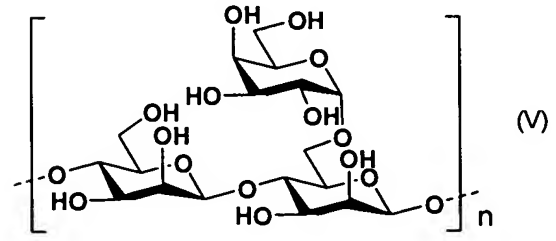
(1) a process of preparing a mannose disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) of the formula (I)



(I)

wherein P^1 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, and the wavy line means that $-OP^1$ is linked at an axial or equatorial position, or mixture of both,

by hydrolyzing guar gum or galactomannan of the formula (V);



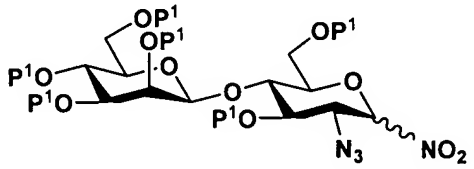
(V)

wherein n is an integer of 50 or more,
and protecting OH groups of the resulting hydrolysate.

12. (New) The method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of a reducing terminal in a core sugar chain structure of an asparagine-linked glycoprotein of claim 11, further comprising each of

(2) a process of preparing a glycal compound, in which mannose of a reducing terminal of the mannose disaccharide is converted to glycal, by halogenation and reduction of the mannose disaccharide (a type of $ManP^1\beta1\rightarrow4ManP^1$), and

(3) a process of preparing an azide disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) shown with formula (II) in which a 2-azide group of mannose in a reducing terminal is linked at an equatorial position;



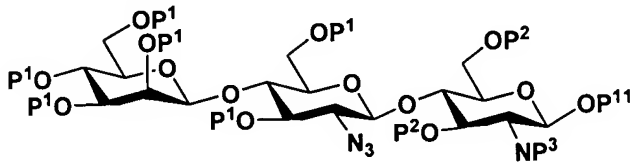
(II)

wherein P^1 is the same as described above, the wavy line means that $-NO_2$ is linked at an axial or equatorial position, or mixture of both,
by azidenitration reaction of the glycal compound above.

13. (New) The method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of a reducing terminal in a core sugar chain structure of an asparagine-linked glycoprotein of claim 12, further comprising

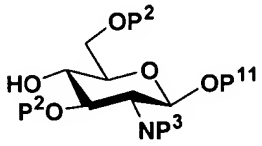
(4) a process of substituting the nitro group of the azide disaccharide compound (a type of $ManP^1\beta1\rightarrow4ManP^1$) with a leaving group selected from the group consisting of fluorine atom, chlorine atom, trihaloacetoimidate, pentenyl, alkylthio and arylthio, and

(5) a process of preparing a trisaccharide compound (a type of Manβ1→4GlcNP^{1}β1→4GlcNP^2) shown with the formula (III);



(III)

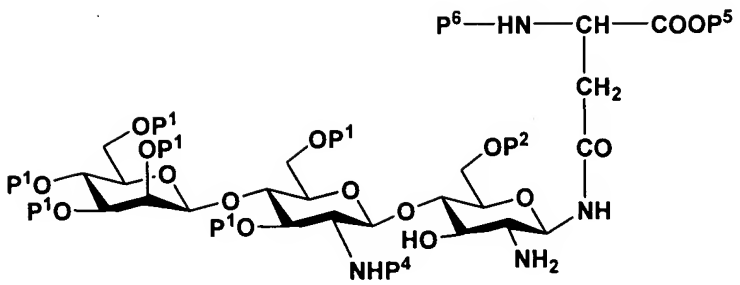
wherein P^1 is an OH- protecting group, as described above, P^2 is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, P^3 is an amino-protecting group selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl, and P^{11} is an OH-protecting group selected from the group consisting of acetyl, benzyl, 4-methoxybenzyl, benzoyl, methoxymethyl, tetrahydropyranyl, trimethylsillyl and triethyl silyl, by a reaction of the product having the leaving group with amino-protected glucopyranoside shown with the formula;



wherein P^2, P^3, and P^{11} are the same as described above.

14. (New) The method for preparing a trisaccharide (Manβ1→4GlcNβ1→4GlcN) of a reducing terminal in a core sugar chain structure of an asparagine-linked glycoprotein of claim 13, further comprising

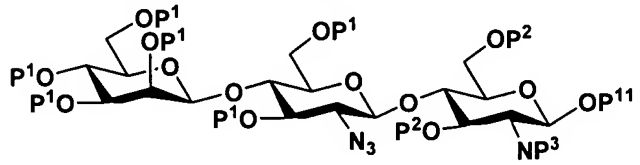
(6) a process of preparing an asparagine-linked trisaccharide (Manβ1→4GlcNP^{1}β1→4GlcNP^2) compound shown with the formula (IV);



(IV)

wherein P^1 and P^2 are independently OH- protecting groups, as described above, P^4 and P^6 are independently amino-protecting groups selected from the group consisting of phthalimide, tert-butyloxycarbonyl, benzyloxycarbonyl, acetyl, benzoyl and benzyl, and P^5 is a carboxyl-protecting group which is t-Bu,

by deprotecting the P^{11} group of the compound (III),



(III)

wherein P^1, P^2 and P^{11} are independently OH- protecting groups, as described above, and P^3 is an amino-protecting group, as described above,

reducing the azide group to an amino group, protecting the amino group with an acetyl group, forming an oxazoline ring simultaneously with deprotecting a hydroxy group of a reducing terminal, and coupling with a protected asparagine derivative after introducing a –N=C=S group at the reducing terminal.